



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/537,192	03/29/2000	Xiao-Dong Sun	GLO 2 0029	6864

7590 03/25/2004

Scott A McCollister Esq
Fay Sharpe Fagan Minnich & McKee LLP
1100 Superior Avenue
7th Floor
Cleveland, OH 44114-2518

EXAMINER

ROY, SIKHA

ART UNIT	PAPER NUMBER
----------	--------------

2879

DATE MAILED: 03/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/537,192

Applicant(s)

SUN ET AL.

Examiner

Sikha Roy

Art Unit

2879

AW

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9 and 14-19 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0300</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-9 and 14-19, drawn to lamp, classified in class 313, subclass 512.
- II. Claims 10-13, drawn to method of making a lamp, classified in class 438, subclass 7.

The inventions are distinct, each from the other because of the following reasons:

Inventions Group I and Group II are related as product and process of making it.

The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process. For example the product can be made by placing the light emitting device in the mounting area, covering with encapsulation having a volume same as that of the mounting area and then curing the encapsulation along with the light emitting device.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Art Unit: 2879

During a telephone conversation with Mr. Scott McCollister on March 9, 2004 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-9 and 14-19. Affirmation of this election must be made by applicant in replying to this Office action. Claims 10-13 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

Claim 6 recites the limitation "light emitting diode element". There is no recitation of 'diode' in claims 1 and 3. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 5, 6 and 14-19 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,576,930 to Reeh et al.

Regarding claim 1 Reeh discloses (Fig. 5 column 11 lines 45-67 column 13 lines 47-67) solid state lamp comprising a light-emitting element 1 (semiconductor body), a mounting area 16 having a recess adopted to contain the light-emitting element and a suspension medium 5 disposed between the mounting area and the light emitting element surrounding the light emitting element within the mounting area 16.

Regarding claim 2 Reeh discloses (column 11 lines 50-57) the suspension medium is composed of transparent plastic preferably epoxy resin.

Regarding claim 3 Reeh discloses (Fig. 5 column 13 lines 47-52) the suspension medium includes a first layer 5 disposed between the mounting area and the light emitting element 1 and a second layer 10 covering the light element 1 and the first layer 5.

Regarding claim 5 Reeh discloses (column 11 lines 55-59) the first layer comprises phosphor (luminescent material) 6.

Regarding claim 6 Reeh discloses in Fig. 14 that there is a third layer 36 disposed between the light emitting element 1 and the second layer 10.

Regarding claim 14 Reeh discloses (Fig. 4 column 13 lines 15-30) a photonic device comprising a mounting area 16, spacing element (transparent encapsulation) 15 which spaces the semiconductor device 1 from the mounting area and fixes the semiconductor device within the mounting area.

Regarding claim 15 Reeh discloses the spacing element is optically transparent encapsulation disposed between the semiconductor device and the mounting area.

Regarding claim 16 Reeh discloses (Fig. 10 column 6 lines 21-26 column 9 lines 1-5, column 13 lines 5-10) optically transparent media disposed between the mounting area and semiconductor device comprises silicone epoxy resin with phosphor (luminescent material) particles.

Regarding claim 17 Reeh discloses (column 14 lines 38-50) the optically transparent encapsulation comprises epoxy resin and fillers such as TiO_2 , SiO_2 which inherently act as thermally conductive fillers.

Regarding claim 18 Reeh discloses (column 13 lines 50,51 Fig. 4) the semiconductor device disposed in the mounting area is affixed by another transparent encapsulation 10 disposed over the semiconductor device 1 and the spacing element 15.

Regarding claim 19 Reeh discloses in Fig. 14 the photonic device further comprises a phosphor layer 36 over the semiconductor device between the spacing element 35 and encapsulation 10, the means for affixing the semiconductor device.

Claim 14 is rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,015,719 to Kish et al.

Regarding claim 14 Kish discloses (Fig. 2 column 1 lines 61-67) a photonic device comprising a mounting area (reflector cup) 14, a spacing element 12 (Ag epoxy) which spaces the semiconductor device (LED) 10 from the mounting area and affixes the semiconductor device 10 substantially within the mounting area 14.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.

Patent U.S. Patent 6,576,930 to Reeh et al.

Claim 4 differs from Reeh in that Reeh does not explicitly disclose layers comprising thermally conductive filler.

Reeh discloses (Figs. 4,5 column 14 lines 45-50) the second layer comprising transparent encapsulation 10 having light diffusing particles such as TiO₂, SiO₂. It is elementary that mere recitation of a newly discovered function or property, intrinsically possessed by things in the prior art, does not cause a claim drawn to distinguish over the prior art. Additionally, where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an intrinsic characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on. *In re Swinehart*, 169 USPQ 226 (CCPA 1971). Thus, the functional limitation of thermally conducting filler is taught by Reeh under intrinsic functional principles.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent U.S. Patent 6,576,930 to Reeh et al. and further in view of U.S. Patent 5,777,433 to Lester et al.

Regarding claim 9 Reeh does not disclose dielectric particles (TiO_2 , SiO_2) to be nano-particles.

Lester in analogous art of semiconductor light-emitting chip discloses (Fig. 3 column 4 lines 25-47) the package material 41 comprises nano-particles of TiO_2 , substantially smaller in size than the wavelength of the light emitted from LED chip 42 such that the package material can be transparent to the light emitted from the chip. TiO_2 is intrinsically dielectric. Lester further notes (column 2 lines 30-38) that this packaging material (epoxy) having nano particles of TiO_2 improves the efficiency of the semiconductor light emitting device by increasing the effective refractive index of encapsulating material.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include nano-particles of TiO_2 , in the first or second layer of the lamp of Reeh as taught by Lester for improving the efficiency of the semiconductor light emitting device by increasing the effective refractive index of encapsulating material.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent U.S. Patent 6,576,930 to Reeh et al. and U.S. Patent 5,777,433 to Lester et al. and further in view of U.S. patent 6,015,719 to Kish et al.

Claim 7 differs from Reeh and Lester in that Reeh and Lester do not disclose thermally conductive filler comprising from the set of gold and silver.

Kish discloses (Fig. 2 column 1 lines 64,65) silver loaded epoxy used in a light-emitting semiconductor device. It is well known in the art that silver has a high thermal conductivity and hence can conduct the heat away from the LED chip.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include epoxy loaded with nano particles of silver as suggested by Kish in the encapsulation of Reeh and Lester for conducting heat away from the solid state lamp.

Allowable Subject Matter

Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record neither teaches nor suggests a solid state lamp with all the limitations as claimed in claim 8 and particularly the limitation of one layer comprising single crystal nano-particles.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent 5,813,753 to Vriens et al., U.S. Patent 5,962,971 to Chen and U.S. Patent 6,274,890 to Oshio et al. disclose semiconductor light-emitting

Art Unit: 2879

device with encapsulation. U.S. Patent 5,618,872 to Pohl et al. discloses inorganic fillers used as embedding compositions with light-emitting diodes. JP 2001-135768 to Tsuji discloses silver loaded epoxy used for affixing LED.

Contact Information


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (571) 272-2463. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

S.R.

Sikha Roy
Patent Examiner
Art Unit 2879


ASHOK PATEL
PRIMARY EXAMINER